Wyoming

Greater Green River Basin

Index map showing locations of figure 1 (shaded),

Springs uplift (RSU) in the Greater Green River

0 5 10 15 KILOMETERS

Figure 1. Generalized geologic map of the east flank of the Washakie Basin and southeast flank of the Great Divide Basin showing location of the Doty Mountain 7.5-minute

quadrangle and adjacent quadrangles. Modified from Love and Christiansen (1985) and Honey and Hettinger (2004).

Great Divide Basin (GDB), Sand Wash Basin (SWB), Washakie Basin (WB), Rawlins uplift (RU), and Rock collected about 50 ft above the conglomeratic horizon in the Blue Gap quadrangle (see Hettinger and Honey, 2005); and sample D6470 was collected about 360 ft above the conglomeratic horizon in the Doty Mountain quadrangle (near measured section 20, this report).

Palynomorphs from the collections were identified in Hettinger and others (1991). Early Paleocene palynomorphs typical of zone P2 of Nichols and Ott (1978) were identified from samples D6860 and D6470, and Late Cretaceous (Maastrichtian) palynomorphs were identified from sample D6474.

The China Butte Member is about 1,065 ft thick in the southern part

of the quadrangle at its type section in secs. 3 and 4, T. 16 N., R. 92 W. (fig. 3). The member is about 1,700 ft thick where exposed in the northern part of the quadrangle, and about 1,565–1,760 ft thick in the subsurface north of Muddy Creek. Mapped coal zones in the China Butte Member (fig. 3) include, from youngest to oldest, the Fillmore Ranch (FR), local unnamed coal beds (C), Muddy Creek (containing coal beds MC3, MC1, MC, and MClower), Separation Creek (containing coal beds SC1 and SC2), lower Separation Creek (*lowerSC*), Wild Cow (*WC*, containing coal beds *WC1* and *WC2*), lower Olson Draw (containing coal beds lower OD1 and lower OD2), Red Rim (RR), and Red Rim lower (RRlower). The Fillmore Ranch, Muddy Creek, Separation Creek, Olson Draw, and Red Rim coal zones were originally named and mapped in the Seaverson Reservoir and Fillmore Ranch 7.5-minute quadrangles (fig. 1) by Edson (1979) and Honey and Hettinger (1989b). Coal-zone nomenclature of Honey and Hettinger (1989b) is shown along the right margin of the coal correlation chart (sheet 2). Based on detailed mapping and correlation studies, the names have been applied to coal zones in the Doty Mountain 7.5-minute quadrangle. The following modifications have been made to the established coal-zone nomenclature of Edson (1979) and Honey and Hettinger (1989b):

(1) The Muddy Creek coal bed of Edson (1979) and Honey and Hettinger (1989b) is one of several coal beds that occupy an interval of mudrock and sandstone referred to as the Muddy Creek coal zone in this report. The Muddy Creek coal zone contains the MC3, MC1, MC, and MClower coal beds, which were mapped individually. The Muddy Creek coal bed of Edson (1979) is the MC coal bed in the northern part of the Doty Mountain 7.5-minute quadrangle. The outcrop of the Muddy Creek coal bed was mapped incorrectly by Edson (1979) near the boundary between the Doty Mountain and Seaverson Reservoir 7.5-minute quadrangles. We have therefore revised its position where it extends into the Doty Mountain quadrangle.
(2) The Wild Cow coal zone is informally named for coal-bearing strata located between the lower Olson Draw and lower Separation Creek coal zones in the Doty Mountain 7.5-minute quadrangle; it takes its name from Wild Cow Creek in the Blue Gap 7.5-minute quadrangle

ance Formation (Upper Cretaceous) Red Rim Member—Mainly very light gray and white, fine- to coarse-grained, quartz-rich sandstone containing grains of feldspar, clay altered from feldspar, and black chert. Chert pebbles are common in upper part of member. Sandstone is soft and friable, forming valley floors, covered slopes, and cliffs. Laterally continuous, 20- to 170-ft-thick units of sandstone are separated by 5- to 15-ft-thick units of brown and gray mudrock. The thickness and abundance of sandstone increases upward through the member as mudrock decreases. Sandstone units consist of vertically and laterally amalgamated, channel-form bodies that are 5-20 ft thick, massive to trough crossbedded, ripple laminated, and capped by thin ironstone ledges; iron-oxide concretions several feet across are common. Basal lags of flat claystone clasts as much as 1 in. long and blocks of mudrock several feet across are common. The sandstone bodies are interpreted as fluvial channel deposits. The member also displays an overall coarsening-upward grain size, with the lower 600 ft being fine to medium grained and the upper 100 ft being medium to very coarse grained and pebbly. Pebbles are chert and are $\frac{1}{4}$ - $\frac{1}{2}$ in. in diameter; they are generally along foresets, in lag, or as isolated clasts in sandstone matrix. Channel bodies in the upper 100 ft display strong crosscutting relations. The Red Rim Member is about 685 ft thick at its type section in sec. 3, T. 16 N., R. 92 W. (fig. 3). It thickens from south to north and is about 740–1,100 ft thick in oil and gas wells in the northwestern part of the quadrangle. At the type section, the basal contact was placed at the first major sandstone in a succession of thick laterally continuous sandstones

that characterize the member. The member appears to intertongue with

are uncertain due to poor exposures. Late Cretaceous (Maastrichtian) palynomorphs were identified in USGS palynomorph samples D5099-A, D5099-B, and D5099-C, collected about 65, 80, and 260 ft above the base of the member, respectively (figs. 2, 3). Sample localities are shown on the geologic map (sheet 1) as well as stratigraphic section 40 on sheet 2. Samples D5099-A and D5099-B were collected about 800 ft south of section 40 and projected to the section by tracing strata. Late Cretaceous (Maastrichtian) palynomorphs were also identified in USGS palynomorph sample D6474, collected 85 ft below the top of the member about 10 mi south of the Doty Mountain quadrangle in the Peach Orchard Flats quadrangle (fig. 1) (Honey and Hettinger, 2004). Palynomorphs from the collections were identified in Hettinger and others (1991) **Lower member**—Predominantly thin, interbedded, yellow-brown, duskybrown, medium- to dark-gray, and greenish-gray mudrock that includes claystone, siltstone, clayey shale, and carbonaceous shale. Plant fragments are common in the mudrock, and leaf impressions are present in a few interbedded sandstones. Upper part of member is poorly exposed; oil and gas wells in the northwestern part of the quadrangle indicate that the upper 250–500 ft is dominated by 10- to 200-ft-thick sandstones separated by 10- to 70-ft-thick units of mudrock. Stratigraphically equivalent sandstones exposed in the Blue Gap and Peach Orchard Flats quadrangles (fig. 1) are yellow brown to very light gray, fine to medium grained, massive or trough crossbedded, lenticular, and multistoried (Honey and Hettinger, 2004; Hettinger and Honey, 2005). The sandstones contain the first appearance of detrital chert above the Lewis Shale (Hettinger and others, 1991).

Sandstone is a minor component in the lower 950–1,150 ft of the member, where it typically forms purplish-brown to gray, lenticular, very fine grained to fine-grained, ripple-laminated beds less than 5 ft thick. The lower part also contains rare lenticular bodies of yellow-gray to very light gray, very fine grained to fine-grained, and trough-crossbedded sandstone as much as 50 ft thick. The basal 50 ft contains lenticular beds of coguina and two or three unnamed beds of coal that range between 1 and 8.5 ft thick. A 3-ft-thick coal bed is also present locally 250 ft above the base of the lower member. The lower member of the Lance Formation is interpreted to have accumulated in fluvial, flood-plain, coastal-plain, and lagoonal environments. Coastal-plain and mire deposits in the basal 50 ft intertongue with shoreface strata in the underlying Fox Hills Sandstone. The lower member is about 1,260–1,450 ft thick where it was drilled in the northwestern part of the quadrangle. About 10 mi south of the Doty Mountain quadrangle, in secs. 28, 29, and 33, T. 15 N., R. 92 W., the lower member is about 1,675 ft thick on outcrop (Honey and Hettinger, Kfld Fox Hills Sandstone, upper part of the Lewis Shale, and Dad Sandstone Member of the Lewis Shale, undivided (Upper Cretaceous)—The strata

environment (Gill and others, 1970). Combined thickness ranges from 2,050 to 2,180 ft in oil and gas wells listed in table 1. Individual formations and members are described below. The Fox Hills Sandstone is dominated by interbedded thick to thin sandstone and shale units typically stacked in coarsening-upward successions; the formation is 160–300 ft thick in outcrop (Henderson, 1962) and 300–390 ft thick in the subsurface. Stratigraphic sections by Henderson (1962) indicate outcrops contain one to three sandstones, each about 15–100 ft thick; sandstones are separated by 10- to 160-ft-thick units of thinly interbedded sandstone and shale. In oil and gas wells, the Fox Hills contains five to nine 10- to 90-ft-thick sandstones separated by 5to 70-ft-thick units of thinly interbedded sandstone and shale. Exposures of sandstone are generally grayish orange to yellowish gray, concretionary, very fine to medium grained, and generally massive but also trough crossbedded and ripple laminated; oyster shells and trace fossils of Ophiomorpha are common. Shales are gray, silty, and locally carbonaceous, and contain thin beds of fine-grained sandstone. One or two coal beds, 0.7-4.0 ft thick, are present 60-90 ft below the top of the formation. The base of the Fox Hills is gradational with the underlying The upper part of the Lewis Shale is poorly exposed. Witton (1999)

were mapped as a single unit because the upper part of the Lewis Shale is

environments, and the Lewis Shale was deposited in a deep-water marine

Sandstone was deposited in shallow-marine, barrier-bar, and beach

poorly exposed and difficult to separate from adjacent strata. The Fox Hills

described exposures 3 mi south of the Doty Mountain quadrangle, in secs. 24 and 25, T. 16 N., R. 92 W., in the Blue Gap quadrangle (fig. 1). There, the upper part consists of olive-gray, silty shale with thin beds of silty, very fine grained sandstone. Sandstone beds are massive to parallel laminated, have abundant slump features and nonscoured bases, and extend several to several hundred feet laterally. Witton (1999) interpreted the sandstones as turbidite deposits that accumulated on the upper slope between the shelf and deep basin. In the subsurface of the Doty Mountain quadrangle, the upper part of the Lewis Shale is 255–480 ft thick and characterized by several coarsening-upward successions of shale and siltstone; sandstones as much as 30 ft thick cap some successions. The Dad Sandstone Member of the Lewis Shale is poorly exposed, forming covered valleys with small rounded hills and cuestas. It consists of thick, pale-yellowish-gray and light-brown, locally concretionary sandstones in olive-gray mudrock. Mudrock comprises thinly interbedded to interlaminated very fine grained sandstone, siltstone, and mudstone. Oil and gas wells in the Doty Mountain quadrangle indicate the member contains between 400 and 600 ft of net sandstone; sandstone-dominated intervals as much as 250 ft thick are common. Member is 1,250–1,560 ft thick where drilled in the northwestern part of the quadrangle, but thins to the south and is about 1,050 ft thick (spanning depths of 2,420 and 3,470 ft) in the Tom Brown No. 1 Federal drill hole located 2 mi south of the quadrangle in sec. 22, T. 16 N., R. 92 W. Witton (1999) described the Dad Sandstone Member about 3 mi south of the Doty Mountain quadrangle, in secs. 24 and 25, T. 16 N., R. 92 W., as follows: (1) the upper part contains laterally discontinuous channel-fill sandstones with deeply scoured bases, basal lags, and multiple channel fills consisting of massive to parallel-laminated sandstone that locally exhibits soft-sediment deformation, and (2) the middle and lower parts contain flat-based, massive

The member, which intertongues with the underlying lower part of the Lewis Shale, was interpreted as a suspension fallout and turbidite deposit in a marine environment (Perman, 1990; Pyles and Slatt, 2000; Witton 1999)

Lower part of the Lewis Shale (Upper Cretaceous)—Dark-gray sandy shale with a few thin continuous sandstones. The sandstones probably extend laterally into the Dad Sandstone Member. Only the upper 250 ft are exposed in the southwestern part of the quadrangle. Drill holes indicate that the lower part of the formation is 720–820 ft thick in the southern part of the quadrangle (secs. 11 and 12, T. 16 N., R. 92 W.), 570–600 ft thick in the northwestern part of the quadrangle, and 820 ft thick at the Nova Petroleum Muddy Creek 18-1 drill hole located in sec. 18, T. 17. N. R. 91 W. The lower part of the Lewis Shale intertongues with the

underlying Upper Cretaceous Almond Formation of the Mesaverde Group

to parallel-laminated, or convoluted, laterally continuous, sheet sandstones.

Coal bed or coal zone—Solid line where approximately located; long dash across poorly exposed area where presence is inferred from aerial photographs, drill holes, coal flour, or animal burrows; short dash where inferred beneath mapped surficial deposits. Abbreviations: Fillmore Ranch coal zone (FR); local unnamed coal beds (C); Muddy Creek coal zone (containing coal beds MC3, MC1, MC, and MClower); Separation Creek coal zone (containing coal beds SC1 and SC2); lower Separation Creek coal zone (lowerSC); Wild Cow coal zone (WC, containing coal beds WC1 and WC2); lower Olson Draw coal zone (containing coal beds lower OD1 and lower OD2); Red Rim coal zone (RR); and Red Rim lower coal zone (RRlower). South of measured section 41, coal beds MC1 and MC3 are

mapped with a single line labeled *MC1,3*. Cretaceous coals are not named

Clinker—Burned coal bed and baked rocks

Large area of clinker

Fault—Long dash where approximately located; short dash where inferred; queried where uncertain. Bar and ball on downthrown side

Anticline—Showing crestline and direction of plunge. Approximately located; dotted where concealed

Strike and dip of beds

Measured on outcrop

Inclined

Vertical

Measured photogrammetrically on a computerized PG-2
plotter—Inclined

Drill hole—Showing number on geologic map (sheet 1), coal correlation chart (sheet 2), and table 1
 Line of measured stratigraphic section—Showing number on geologic map (sheet 1) and coal correlation chart (sheet 2)
 Short measured section of coal bed or coal zone—Showing number on geologic map (sheet 1) and coal correlation chart (sheet 2); leader points to measured section locality
 INTRODUCTION

The geology of the Doty Mountain 7.5-minute quadrangle, Carbon County, Wyoming (sheet 1), was mapped in 1976–1978 to acquire detailed data on Upper Cretaceous and aleocene coal-bearing strata in the eastern part of the Washakie Basin (fig. 1). The geology was initially plotted in the field onto aerial photographs at scales of about 1:20,000, :29,000, and 1:36,000, as well as on the 1:62,500-scale topographic base of the 1957 Doty Mountain 15-minute quadrangle map. Coal beds and stratigraphic sections were trenched and measured with a Jacob's staff and tape. Emphasis was on coal-bearing strata in the Paleocene Fort Union Formation and Upper Cretaceous Lance Formation. Subsurface coal in the Upper Cretaceous Mesaverde Group was not studied. Our preliminary coal correlation charts and preliminary maps of coal outcrops and faults were shown on planimetric base maps by the Dames and Moore Company (1979; their plates 1 and 3) to show the coal stratigraphy in the quadrangle. Love and Christiansen (1985) also included our unpublished mapping on the Geologic Map of Wyoming. We subsequently transferred the geology onto the 1:24,000-scale topographic base map of the 1982 Doty Mountain 7.5-minute quadrangle from the aerial photographs using a PG-2 stereoplotter. This report shows the geology we mapped on a topographic base and revises our coal correlations that were shown by Dames and Moore Company (1979); it also includes additional stratigraphic sections we measured in 1988. Measured sections of coal-bearing strata in the Fort Union and Lance Formations are shown on sheets 1 and 2. Also shown are lithologic interpretations of geophysical logs recorded from twenty drill holes (table 1 on sheet 2); included are seven oil and gas wells, six coal-test holes drilled in 1977 and 1978 by the U.S. Geological Survey (USGS), and seven coal-test holes drilled by the Rocky Mountain Energy Company and Union Pacific Corporation. Geophysical logs for UGSG drill holes DM-D1 and DM-D2 (DH-2 and DH-3, respectively, on table 1) are shown in Hettinger and Brown (1979). Geophysical logs for USGS drill holes DL-D1, DM-3, DM-4, and DM-5 (DL-D1, DH-10, DH-9, and DH-11, respectively, on table 1) are available on microfiche through M.J. Systems, 5085 Oakland Street, Denver, CO, 80239. quadrangle (fig. 2). Thicknesses of formations and members in figure 2 are based on measured surface sections as well as selected drill holes listed in table 1. Included are marine and shoreface deposits of the Upper Cretaceous Lewis Shale and Fox Hills Sandstone, and continental deposits of the Upper Cretaceous Lance Formation, Paleocene Fort Union Formation, Eocene main body of the Wasatch Formation, and Oligocene(?) and Miocene(?) Browns Park Formation(?). The Lewis Shale overlies the Upper Cretaceous Almond Formation of the Mesaverde Group, which is exposed east of the quadrangle. The Lewis

Shale consists of a lower part, the middle Dad Sandstone Member, and an upper part; a principal reference section was described by Gill and others (1970) about 10 mi south of the quadrangle. The Lance Formation consists of a lower member and the Red Rim Member, and the Fort Union Formation consists of the China Butte, Blue Gap, and Overland Members (Honey and Hettinger, 2004). The type sections of the Red Rim, China Butte, and Overland Members are in the Doty Mountain and adjacent Duck Lake 7.5-minute guadrangles and detailed measured sections are shown in figure 3. With the following exceptions, all of the previously described formations and members were mapped in the Doty Mountain 7.5-minute quadrangle: (1) the Dad Sandstone Member, upper part of the Lewis Shale, and Fox Hills Sandstone were mapped as a single unit because the upper part of the Lewis Shale is poorly exposed, very sandy, and difficult to distinguish from its adjacent strata; (2) the Blue Gap Member pinches out in the vicinity of the Dad arch (fig. 1) and was not mapped in the quadrangle; however, its equivalent strata is included within the uppermost 20 ft of the China Butte Member in the southwestern part of the quadrangle. Strata in the Doty Mountain 7.5-minute quadrangle generally strike northeast-southwest and dip 3°-30° northwest. These rocks lie on the northern limb of the east-west-trending and westwardly plunging Dad arch (fig. 1), which is located immediately south of the quadrangle. Beds in the southwestern part of the quadrangle, in the Cedars area (fig. 1), are oriented approximately north-south and dip to the west, due to folding near the crest of the Dad arch. Strata in the northwestern part of the quadrangle also strike approximately north-south to slightly northeast-southwest and dip to the west or northwest, owing to subtle folding. Where exposed, the Lewis Shale is inclined 3°-6°, the Lance Formation 10°-25°, the China Butte Member 20°-30° (south of Muddy Creek), and the Overland Member 3°−10°. The steeper dips in the Lance and Fort Union Formations are on the west-dipping mb of a monocline that extends south across the Dad arch and into the Blue Gap and Peach Orchard Flats quadrangles (see mapping by Honey and Hettinger, 2004; Hettinger

and Honey, 2005). Several extensional faults trend from the Cedars area (fig. 1) northeast to the south side of Doty Mountain. Faulting in that area is complex and some faults, in addition to those mapped, may be obscured by surficial cover. Faults dip north and northwest and displacement is down to the north and northwest. Reverse drag on the downthrown sides has tilted beds 4°-39° southward toward the faults, indicating a possible listric origin. Anticlinal axes mapped along the flexures are associated with the reverse drag. Thirty-five wells have been drilled for oil and gas in the Doty Mountain 7.5-minute quadrangle (fig. 4, table 2). Named fields include Baldy Butte, Creston, Cow Creek, and Doty Mountain. Producing strata and trapping conditions in the fields are as follows: (1) Baldy Butte—stratigraphic traps in the Upper Cretaceous Almond Formation (Specht, 992) and some production from the Lewis Shale (Wyoming Oil and Gas Conservation ommission, 2005); (2) Creston—stratigraphic traps in the Upper Cretaceous Almond and Ericson Formations (Coalson, 1979); (3) Cow Creek—structural and (or) stratigraphic traps in the Cretaceous Mesaverde Group, and Morapos, Frontier, and Dakota Formations, and Jurassic Nugget Sandstone (Reinert, 1979); (4) Doty Mountain—gas from coal beds in the Upper Cretaceous Mesaverde Group (Wyoming Oil and Gas Conservation Commission,

We thank Ven Barclay for discussions regarding stratigraphy in the eastern part of the Greater Green River Basin, and for providing mapping of some of the Quaternary deposits near the eastern boundary of the quadrangle. Christopher Potter provided insight regarding faulting in the vicinity of Doty Mountain. Steve Roberts and Art Clark drilled USGS coal-test holes DM-3, DM-4, DM-5, and DL-D1, and field assistance was provided by Judith Back and Robert Brown. Joseph East provided digital cartography for the geologic map. We thank the Anadarko Petroleum Company for granting permission to show our interpretations of holes drilled by their subsidiaries, the Rocky Mountain Energy Company and Union Pacific Corporation. We appreciate the comprehensive reviews by Margaret Ellis and Robert O'Sullivan, and the editorial reviews by William Keefer and Alessandro Donatich.

Coalson, E.B., 1979, Creston Unit III (Creston), in Oil and Gas Field Symposium Committee, eds., Wyoming oil and gas fields symposium, Greater Green River Basin: Wyoming Geological Association, p. 113.
Dames and Moore Company, 1979, Coal resource occurrence and coal development potential maps of the northwest quarter of the Doty Mountain 15-minute quadrangle, Carbon County, Wyoming: U.S. Geological Survey Open-File Report 79–1382, 38 p., 32 oversized sheets, scale 1:24,000.
Edson, G.M., 1979, Preliminary geologic map and coal sections of the Seaverson Reservoir quadrangle, Carbon County, Wyoming: U.S. Geological Survey Open-File Report 79–1577, scale 1:24,000.
Gill, J.R., Merewether, E.A., and Cobban, W.A., 1970, Stratigraphy and nomenclature of some Upper Cretaceous and lower Tertiary rocks in south-central Wyoming: U.S. Geological Survey Professional Paper 667, 53 p.
Hasiotis, S.T., and Honey, J.G., 2000, Paleohydrologic and stratigraphic significance of crayfish burrows in continental deposits—Examples from several Paleocene Laramide basins in the Rocky Mountains: Journal of Sedimentary Research, v. 70, no. 1, p. 127–139.

Henderson, D.K., 1962, Geology of the Doty Mountain–Dad area, Carbon County, Wyoming; emphasis on stratigraphy of uppermost Cretaceous rocks: Golden, Colo., Colorado School of Mines M.S. thesis, 162 p., 4 plates, scale 1:62,500. Hettinger, R.D., and Brown, R., 1979, Geophysical and lithologic logs of 1977 coal drilling in the Fort Union Formation, Carbon and Sweetwater Counties, Wyoming: U.S. Geological Survey Open-File Report 79–326, 81 p. Hettinger, R.D., and Honey, J.G., 2005, Geologic map and coal stratigraphy of the Blue Gap quadrangle, eastern Washakie Basin, Carbon County, Wyoming: U.S. Geological Survey Scientific Investigations Map 2878, version 1.0, scale 1:24,000. Hettinger, R.D., Honey, J.G., and Nichols, D.J., 1991, Chart showing correlations of Upper Cretaceous Fox Hills Sandstone and Lance Formation, and lower Tertiary Fort Union, Wasatch, and Green River Formations, from the eastern flank of the Washakie Basin to the southeastern part of the Great Divide Basin, Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I–2151, 1 sheet. Hettinger, R.D., and Kirschbaum, M.A., 1991, Chart showing correlations of some Upper Cretaceous and lower Tertiary rocks from the east flank of the Washakie Basin to the east flank of the Rock Springs uplift, Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I–2152, 1 sheet. Honey, J.G., and Hettinger, R.D., 1989a, Cross section showing correlations of Upper Cretaceous Fox Hills Sandstone and Lance Formation, and lower Tertiary Fort Union and Wasatch Formations, southeastern Washakie Basin, Wyoming, and eastern Sand Wash Basin, Colorado: U.S. Geological Survey Miscellaneous Investigations Series Map I–1964, 1 sheet.

Wash Basin, Colorado: U.S. Geological Survey Miscellaneous Investigations Series Map I–1964, 1 sheet.
Honey, J.G., and Hettinger, R.D., 1989b, Stratigraphic sections showing coal correlations within the lower coal zone of the Paleocene Fort Union Formation, Fillmore Ranch and Seaverson Reservoir quadrangles, Carbon County, Wyoming: U.S. Geological Survey Coal Investigations Map C–127, 2 sheets.
Honey, J.G., and Hettinger, R.D., 2004, Geologic map of the Peach Orchard Flat quadrangle, Carbon County, Wyoming, and descriptions of new stratigraphic units in the Upper Cretaceous Lance Formation and Paleocene Fort Union Formation, eastern Greater Green River Basin, Wyoming-Colorado: U.S. Geological Survey Scientific Investigations Map 2835, version 1.1, scale 1:24,000.

EXPLANATION Surficial deposits, undivided (Holocene and (or) Pleistocene) Thn? Browns Park Formation(?) (Miocene(?) and Oligocene(?) Wasatch Formation, main body (Eocene) Overland Member of Fort Union Formation (Paleocene) China Butte Member of Fort Union Formation (Paleocene) Red Rim Member of Lance Formation (Upper Lower member of Lance Formation (Upper Fox Hills Sandstone, upper part of Lewis Shale, and Dad Sandstone Member of Lewis Shale, undivided (Upper Cretaceous) Lewis Shale, lower part (Upper Cretaceous) ——— Contact—Approximately located _____ Fault—Dashed where approximately located; dotted where concealed. Bar and ball on downthrown side **Anticline**—Showing crestline and direction of

plunge. Approximately located

Oil or gas well (includes dry holes)—Well is identified in table 2. Italicized number is elevation (ft), relative to sea level, where the top of the Mesaverde Group was penetrated in well. For well 32, NA indicates the elevation at top of the Mesaverde Group was not available

Scale 1:48,000

1 0.5 0 1 MILE

1 0.5 0 1 KILOMETER

Figure 4. Generalized geologic map of the Doty Mountain 7.5-minute quadrangle showing oil and gas wells and elevations on the top of the Upper Cretaceous Mesaverde Group. Wells are identified in table 2.

Love, J.D., and Christiansen, A.C., 1985, Geologic map of Wyoming: U.S. Geological Survey and the Geological Survey of Wyoming, scale 1:500,000.
Luft, S.J., 1985, Generalized geologic map showing distribution and basal configuration of the Browns Park Formation and Bishop Conglomerate in northwestern Colorado, northeastern Utah, and southern Wyoming: U.S. Geological Survey Miscellaneous Field Studies Map MF–1821, scale 1:250,000.
Nichols, D.J., and Ott, H.L., 1978, Biostratigraphy and evolution of the Momipites-Caryapollenites lineage in the early Tertiary of the Wind River Basin, Wyoming:

Field Studies Map MF–1821, scale 1:250,000.
Nichols, D.J., and Ott, H.L., 1978, Biostratigraphy and evolution of the *Momipites-Caryapollenites* lineage in the early Tertiary of the Wind River Basin, Wyoming: Palynology, v. 2, p. 93–112.
Perman, C.R., 1990, Depositional history of the Maastrichtian Lewis Shale in south-central Wyoming—Deltaic and interdeltaic, marginal marine, and trough deep-water marine environments: American Association of Petroleum Geologists Bulletin, v. 74, no. 11, p. 1695–1717.
Pipiringos, G.N., 1961, Uranium-bearing coal in the central part of the Great Divide Basin,

Sweetwater County, Wyoming: U.S. Geological Survey Bulletin 1099–A, 104 p., scale 1:62,500.
Pyles, D.R., and Slatt, R.M., 2000, A high-frequency sequence stratigraphic framework for shallow through deep-water deposits of the Lewis Shale and Fox Hills Sandstone, Great Divide and Washakie Basins, Wyoming, in Weimer, P., and others, eds., Deep-water reservoirs of the world: Gulf Coast Section Society of Economic Paleontologists and Mineralogists Foundation, 20th Annual Bob F. Perkins Research Conference, p. 836–861.
Reinert, S.L., 1979, Cow Creek, in Oil and Gas Field Symposium Committee, eds., Wyoming oil and gas fields symposium, Greater Green River Basin: Wyoming

Geological Association, p. 106–108.
Sanders, R.B., 1975, Geologic map and coal resources of the Creston Junction quadrangle, Carbon and Sweetwater Counties, Wyoming: U.S. Geological Survey Coal Investigations Map C–73, scale 1:24,000.
Specht, R.G., 1992, Baldy Butte, in Oil and Gas Field Symposium Committee, eds., Wyoming oil and gas fields symposium, Greater Green River Basin and Overthrust Belt: Wyoming Geological Association, p. 28–29.
Swain, B.W., 1957, Fort Union Formation, west flank of Sierra Madre, Carbon County, Wyoming: Laramie, Wyo., University of Wyoming M.S. thesis, 132 p.
Witton, E.M., 1999, Outcrop and subsurface characterization of the Lewis Shale, Carbon County, Wyoming: Golden, Colo., Colorado School of Mines M.S. thesis, 214 p.
Wyoming Oil and Gas Conservation Commission, 2005, On-line database at

http://wogcc.state.wy.us/ [accessed during 2005].

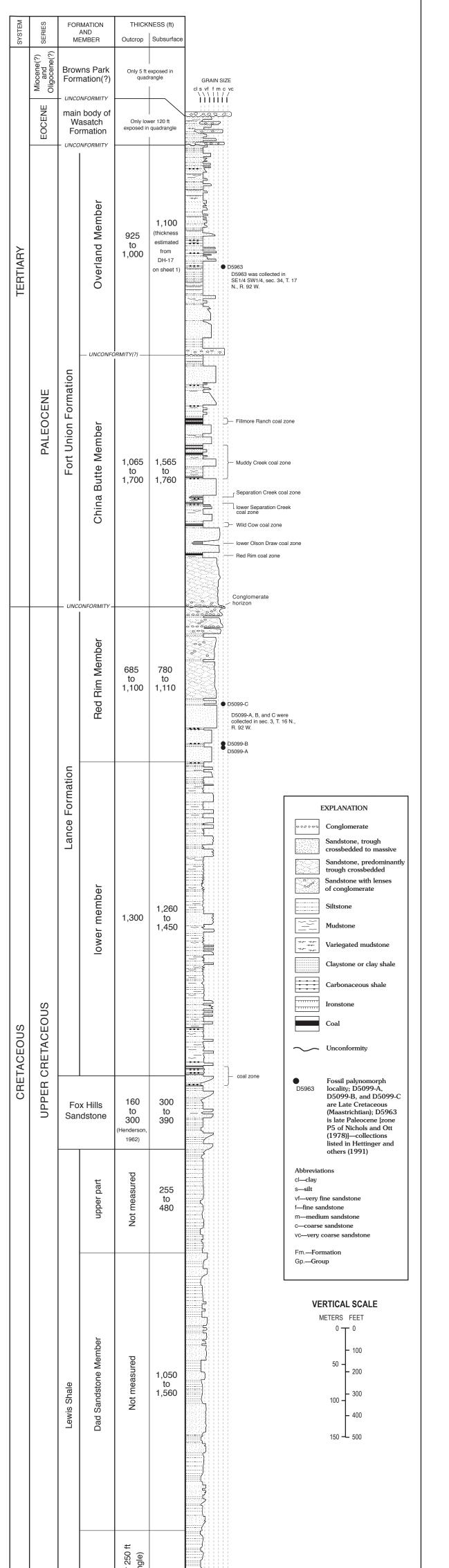


Figure 2. Generalized stratigraphic section of rocks in the Doty Mountain 7.5-minute quadrangle. Lithologies in the Browns Park(?), Wasatch, and Fort Union Formations, and Red Rim Member of the Lance Formation are from measured sections and field descriptions. Lithologies in the lower member of the Lance Formation, Fox Hills Sandstone, Lewis Shale, and Almond Formation are based on field observations and interpretations of geophysical logs from the Snyder Oil Corp. drill hole in sec. 14, T. 17 N., R. 92 W (well #16 of table 2 and fig. 4, and DH-18 on geologic map).

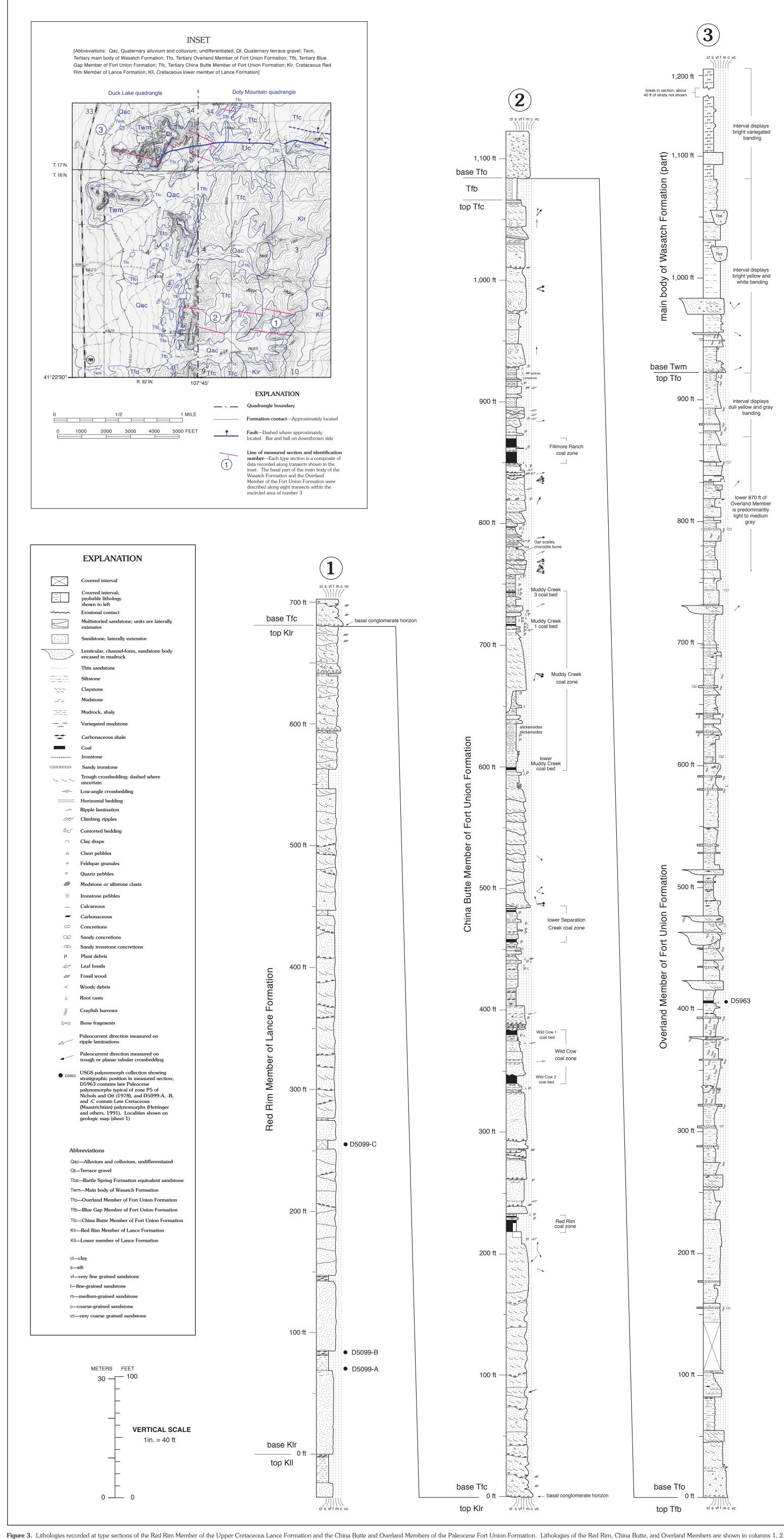
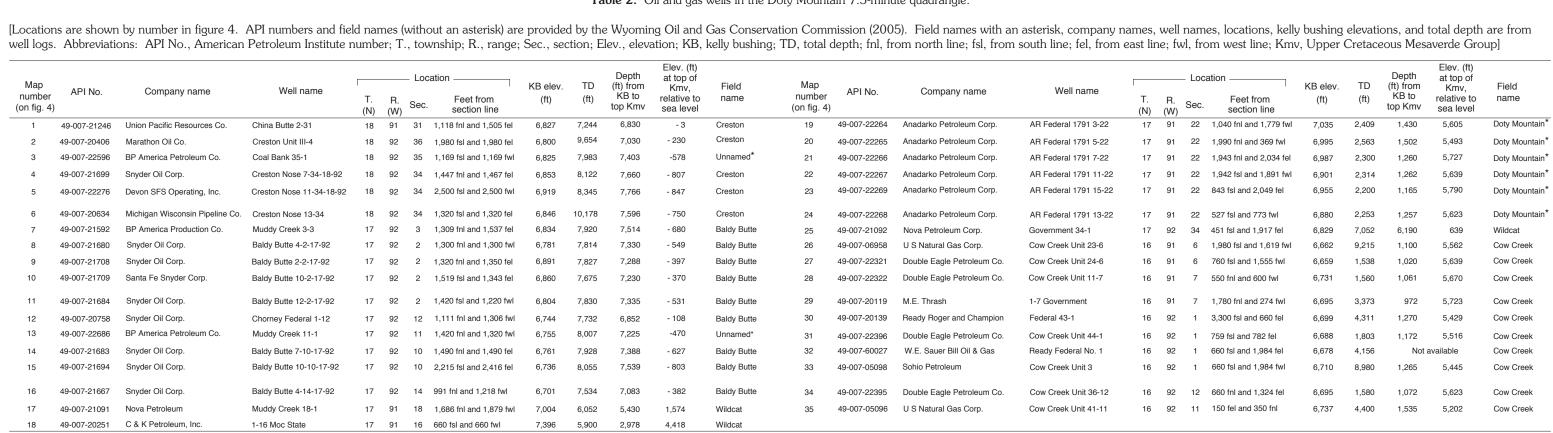


Table 2. Oil and gas wells in the Doty Mountain 7.5-minute quadrangle.



GEOLOGIC MAP AND COAL STRATIGRAPHY OF THE DOTY MOUNTAIN QUADRANGLE, EASTERN WASHAKIE BASIN, CARBON COUNTY, WYOMING

and 3, respectively. The Blue Gap Member of the Fort Union Formation and the lower part of the main body of the Eocene Wasatch Formation are also shown in columns 2 and 3, respectively. Each column represent a composite of data collected along transects with corresponding

numbers shown in the inset. Paleocurrent directions were recorded throughout the China Butte Member and recorded in the Red Rim Member. Members of the Lance and Fort Union Formations were named by Honey and

SCIENTIFIC INVESTIGATIONS MAP 2925